

GYPSY MOTH SUPPRESSION PROJECT SUMMARY
at
CATOCTIN MOUNTAIN PARK
and
HARPERS FERRY NATIONAL HISTORICAL PARK
MAY 6-19, 2008



Report by:
Rodney L. Whiteman, Forester

Forest Health Protection
USDA Forest Service
Morgantown, WV

Between May 6-19, 2008, approximately 8103 acres were aerially treated at Harpers Ferry National Historical Park (HAFE) and Catoctin Mountain Park (CATO) to reduce gypsy moth populations and prevent defoliation.

The gypsy moth nucleopolyhedrosis virus, known better as Gypchek, and *Bacillus thuringiensis* var. *kurstaki* (Btk) were used on this suppression project.

At HAFE, a double application of Gypchek was applied at the rate of 2×10^{11} occlusion bodies in a total mix of 96 ounces per acre per application on 100 acres and a double application of Btk was applied undiluted on 1150 acres at the rate of 96 ounces per acre per application. Total treatment acres at HAFE, including double applications, was 2500.

At CATO, a single application of Btk was applied undiluted on 1145 acres at the rate of 96 ounces per acre and a double application was applied undiluted on 2259 acres at the rate of 96 ounces per acre per application. Total treatment acres at CATO, including double applications, was 5603.

The Btk formulation used on the project was Foray 48B and was applied at both Parks at 36 BIUs per acre per application.

This suppression project was a joint effort between the USDI National Park Service, the USDA Forest Service and Summit Helicopters, Inc.

The primary treatment objective is to prevent noticeable defoliation (<30 percent) from occurring on more than 10 percent of the treatment area. A second objective is to reduce residual gypsy moth populations below the treatment threshold on at least 90 percent of the treatment area.

Two rotary-winged aircraft equipped with a Differential Global Positioning System (DGPS) were used to apply the insecticide. A Bell 206 (N# 206BE) was used from May 6-15 while a Bell 205 (N# 2773H) was used on May 19.

This report documents the spray equipment, insecticides, meteorological conditions, foliage and larval development, and spray coverage for the project. Treatment efficacy will be reported once defoliation surveys are conducted in June and egg mass surveys are completed this fall.

Aircraft and Spray Equipment

Contractor:	Summit Helicopters, Inc.	Summit Helicopters, Inc.
Aircraft:	Bell 206 B III	Bell 205
FAA Number:	206 BE	2773 H
Pilot:	Jim Carlton	Ron Jackson
DGPS Brand:	AG-NAV	AG-NAV
Spray System:	Isolair	Simplex
Nozzle Type:	AU 500 Micronairs	AU 5000 Micronairs
Number of Nozzles:	6	8
Blade Angle:	35°	35°
Plate Number:	136	136
Target VMD:	100-150 microns	100-150 microns
Application Rate:	96 ounces/acre	96 ounces/acre
Boom Pressure:	40 psi	37 psi
Air Speed:	75 mph	85 mph
Swath Width:	100 feet	150 feet
Flow Rate:	11.36 gpm (desired)	19.31 gpm (desired)
	11.36 gpm (actual)	19.23 gpm (actual)

Meteorological Conditions

A summary of weather conditions is listed below for each treatment session.

Date	Park	Time	Temperature (F)	Relative Humidity	Wind Speed (mph)
5/6	HAFE	1853-2005	69-71°	41-44 %	Calm
5/7	HAFE	0555-0945	56-68°	54-73 %	1-5 gusts to 8
5/10	HAFE	1845-1905	59°	54-59 %	0-2
5/11	CATO	0523-1003	44-53°	75-93 %	0-7
5/13	CATO	0615-1130	42-57°	60-96 %	0-4 gusts to 6
	CATO	1905-2025	58-65°	48-55 %	Calm
5/14	CATO	0545-0722	58-61°	54-59 %	0-4
	HAFE	0815-1225	57-71°	50-67 %	2-4 gusts to 7
5/15	CATO	0520-0930	55-62°	79-91 %	0-4
5/19	CATO	0530-0705	44-47°	79-96 %	1-4 gusts to 6

A detailed report of weather conditions is enclosed in Appendix A.

Foliage and Larval Development

Listed below is the daily larval and foliage development data. This information was collected in blocks treated that day.

Date	Park	Larval Development	Foliage Development
5/6	HAFE	58 % first instar 42 % second instar	chestnut oak 60-70 % black oak 50-60 %
5/7	HAFE	40 % first instar 59 % second instar 1 % third instar	chestnut oak 70-75 % red oak 70-75 % white oak 40-50 %
5/10	HAFE	21 % first instar 66 % second instar 13 % third instar	chestnut oak 70-80 % black oak 65-75 %
5/11	CATO	49 % first instar 51 % second instar	chestnut oak 50-60 % red oak 40-50 %
5/13	CATO	62 % first instar 38 % second instar	chestnut oak 50-70 % white oak 35-45 % black oak 40-50 % red oak 50-60 %
5/14	CATO	51 % first instar 48 % second instar 1 % third instar	red oak 60-70 % chestnut oak 65-75 %
	HAFE	65 % second instar 35 % third instar	chestnut oak 90-100 % red oak 90-100 % black oak 75-80 % white oak 70-75 %

5/15	CATO	18 % first instar	red oak	75-85 %
		76 % second instar	chestnut oak	80-90 %
		6 % third instar		
5/19	CATO	12 % first instar	red oak	70-75 %
		48 % second instar	chestnut oak	75-80 %
		40 % third instar	white oak	50-60 %

Spray Coverage

Based on observations made by personnel in the treatment blocks and by viewing the AG-NAV printouts (Appendix B), spray coverage was excellent. There were no significant skips in any of the treatment blocks and very little area outside of the treatment blocks were sprayed.

Project Narrative

The suppression project was divided into 9 treatment areas, five were located at CATO (Figure 1) and four were located at HAFE (Figure 2). The staging area/loading zone for CATO was at Black's Orchard (Figure 1) and for HAFE the staging area/loading zone was at Bolivar Heights (Figure 2).

May 6 The spray aircraft (N# 206BE) arrived at the loading zone/staging area on Bolivar Heights at 1300 and was then re-calibrated for a flying speed of 75 mph. It was originally calibrated for a flying speed of 70 mph on April 16 at the contractor's home base in Cloverdale, VA.

Work meetings covering the work and safety plans, aerial hazards, block treatment sequence and other issues concerning the project were discussed at each Park prior to treatment in each particular Park.

The project commenced that evening at 1850. A total of 3 sorties were flown treating 240 acres. The spray block on Short Hill (Block # 9) was completed along with 49 acres on Loudoun Heights (Block # 8).

May 7 Treatment resumed at HAFE at 0548 and was terminated at 0950. A total of 12 sorties were flown treating 910 acres. Block # 8 was completed along with the larger block on Maryland Heights (Block # 7). All of the first applications of Btk was now complete at HAFE. Weather was still favorable for treatment after the Btk blocks were treated but the carrier for the Gypchek had not arrived. By the time the carrier arrived at HAFE later that morning, weather conditions were not favorable for treatment. The Gypchek block (Block # 5) was then scheduled for treatment in the evening but had to be postponed due to high winds.

May 8 & 9 Rain prevented treatment in block # 6.

May 10 Rain prevented treatment in block # 6 in the morning. The Gypchek was finally sprayed in the evening. Treatment started at 1843 and was finished at 1914. All of the first

applications at HAFE was now complete.

The aircraft then ferried to Black's Orchard so treatment could start at CATO the next day.

May 11 Treatment started at CATO that morning at 0551. A total of 16 sorties were flown treating all of Block # 1 (1263 acres). Rain was forecasted for the evening so treatment for the day was terminated. Heavy rains reached the area around 1700. Over the next 24 hour rain period, CATO received over 3 inches of rain.

May 12 Rain prevented treatment at CATO.

May 13 Treatment resumed at CATO at 0559. A total of 18 sorties were flown in the morning treating 1440 acres in Block #'s 2 and 3. Treatment was terminated in the morning at 1125 for two reasons. The primary reason was to give the pilot a safety break. He had been in the aircraft spraying for 5 1/2 hours without a break. Another reason treatment was terminated was that the winds were starting to gust.

Treatment resumed in the evening at 1855. A total of four sorties were flown in the evening treating 320 acres. In this spray session all of Block #'s 4 and 5 were treated, Block # 2 was finished and an additional 105 acres in Block # 3 was sprayed.

For the day, a total of 22 sorties were flown treating 1760 acres.

May 14 Treatment resumed at CATO in Block # 3 at 0540. Five sorties were flown treating 351 acres in Block # 3. Treatment was now complete in the single application blocks (Block #'s 3, 4 and 5) and the first application was complete in the double application blocks (Block #s 1 and 2).

The aircraft then ferried to HAFE and landed at 0750. The second application began at 0813. Thirteen additional sorties were flown that morning treating 1039 acres. Block # 7 and Block # 8 were treated along with 80 acres in Block # 9. Treatment was terminated at 1225 for a safety break for the pilot, gusty winds and low relative humidity.

Treatment resumed at HAFE that evening at 1850. A total of 4 sorties were flown, treating 211 acres. Block # 9 was completed and Block # 6 was treated.

A total of 22 sorties were flown for the day treating a total of 1601 acres. Treatment is now complete at HAFE. The aircraft then ferried to Black's Orchard.

May 15 The second application started at CATO at 0543. A total of 16 sorties were flown treating all of Block # 1 (1263 acres). Although weather was still favorable for treatment at 1007 when Block # 1 was finished, treatment for the day was terminated. Block # 2 (the other double application block) was treated only 2 days prior on May 13. A minimum of 4 days between applications is desired so treatment was scheduled for May 17.

May 16 No treatment today due to rain/wind and to allow another day between applications.

May 17 No treatment in Block # 2 due to very high winds.

May 18 No treatment in Block # 2 due to rain.

May 19 The contractor provided a Bell 205 (N# 2773H) for the spray operation that morning. This is a much larger aircraft than the Bell 206 (N# 206BE) we had been using for the suppression project. The Bell 205 was also calibrated at the contractor's home base on April 16.

The second application in Block # 2 started at 0526 and was completed by 0714. A total of 4 sorties were flown to treat 966 acres. The project was now complete!

Winds were light while treatment occurred in Block # 2 and remained that way until around 0800. By 0830, winds at CATO exceeded 10 mph with gusts to 15 mph. If the Bell 205 was not used that morning, Block # 2 would not have been finished that day.

The daily sortie reports are enclosed in Appendix C.

A grand total of 8103 acres, including double applications, were treated for the project. At HAFE 2500 acres were treated while 5603 acres were treated at CATO. Treatment went well with no accidents or incidents.

Treatment timing based on larval and foliage development was fair. Ideally, treatment should start in the double application blocks when 10 % of the gypsy moth larvae are in the second instar and the rest are first instar. When treatment started in both HAFE and CATO, approximately half of the larvae were in the second instar. Treatment should have started a few days earlier but was delayed until the contract was awarded. The contract was finally awarded on May 5 and treatment commenced on May 6.

Another delay was caused by the late arrival of the Gypchek carrier. The Gypchek block would have been treated first at HAFE on May 6 but was not treated until May 10 due to the late arrival of the carrier and bad weather. This four day delay is likely to decrease the efficiency of the Gypchek treatment.

No problems were encountered with the spray equipment, ground support equipment and/or personnel provided by the contractor, Summit Helicopters, Inc. The overall production rate of the project was 256 acres an hour. The production rate of the Bell 206 was 239 acres an hour while the production rate of the Bell 205 was 537 acres an hour.

As previously stated, treatment efficacy will be evaluated through defoliation surveys conducted in June and egg mass surveys conducted this fall.

Date	Park	Time	Temperature (F)	Relative Humidity	Wind Speed (mph)
5/6	HAFE	1853	71°	44 %	calm
		1920	69°	42 %	calm
		1942	69°	41 %	calm
		2005	69°	41 %	calm
5/7	HAFE	0555	56°	73 %	1-3
		0618	56°	72 %	1-4
		0635	56°	72 %	1-4
		0714	57°	71 %	1-3
		0747	59°	68 %	2-4
		0812	59°	63 %	2-4 gusts to 8
		0830	62°	63 %	1-3
		0850	63°	56 %	1-4
		0914	65°	58 %	1-3
		0930	66°	56 %	2-5
		0945	68°	54 %	2-5
5/10	HAFE	1845	59°	54 %	1-2
		1905	59°	59 %	calm
5/11	CATO	0623	44°	90 %	calm
		0645	45°	93 %	calm
		0705	46°	93 %	calm
		0725	51°	83 %	calm
		0740	48°	87 %	calm
		0800	50°	90 %	1
		0820	50°	86 %	calm
		0847	52°	84 %	1-2
		0910	53°	80 %	2
		0925	53°	81 %	2-4
		0953	53°	78 %	2-4
		1003	54°	75 %	3-7
5/13	CATO	0615	42°	92 %	2
		0638	43°	95 %	1-3
		0655	43°	96 %	2
		0720	45°	95 %	0-2
		0740	48°	83 %	2
		0800	49°	80 %	2
		0823	50°	79 %	0-2
		0841	51°	77 %	2-3
		0900	53°	73 %	3
		0920	55°	61 %	1-3
		0940	55°	63 %	1-4
		1000	55°	60 %	1-4

Date	Park	Time	Temperature (F)	Relative Humidity	Wind Speed
5/13	CATO	1020	56°	66 %	1-4
		1040	57°	60 %	1-4
		1110	56°	61 %	2-4 gusts to 6
		1130	56°	60 %	2-4 gusts to 6
		1905	65°	48 %	calm
		1919	62°	53 %	calm
		2006	59°	53 %	calm
		2025	58°	55 %	calm
5/14	CATO	0545	58°	59 %	3-4
		0605	59°	57 %	2-4
		0625	59°	54 %	2-4
		0700	59°	58 %	2-3
		0722	61°	57 %	0-3
		0815	57°	67 %	2-3
	HAFF	0900	60°	70 %	2-3
		0934	61°	60 %	2-3 gusts to 5
		0955	63°	61 %	2-4 gusts to 6
		1037	66°	56 %	2-3
		1103	69°	53 %	2-4 gusts to 6
		1135	71°	50 %	2-3
		1158	69°	51 %	2-4 gusts to 6
		1225	71°	50 %	2-4 gusts to 7
		1840	69°	59 %	1-3 gusts to 5
		1920	69°	61 %	2-4
		1940	68°	61 %	1-3
5/15	CATO	0620	55°	91 %	calm
		0645	58°	86 %	calm
		0705	59°	85 %	calm
		0725	59°	87 %	calm
		0745	60°	85 %	calm
		0810	60°	84 %	0-2
		0830	61°	80 %	0-3
		0855	62°	83 %	2-4
		0915	62°	80 %	0-2
		0930	62°	79 %	0-1
5/19	CATO	0530	44°	96 %	1
		0600	46°	99 %	1-3
		0625	47°	82 %	2-4 gusts to 6
		0650	47°	79 %	1-3
		0705	47°	87 %	1

APPENDIX A

METEOROLOGICAL CONDITIONS

DURING TREATMENT

Figure 1. -- 2008 Catocin Mountain Park spray block map.

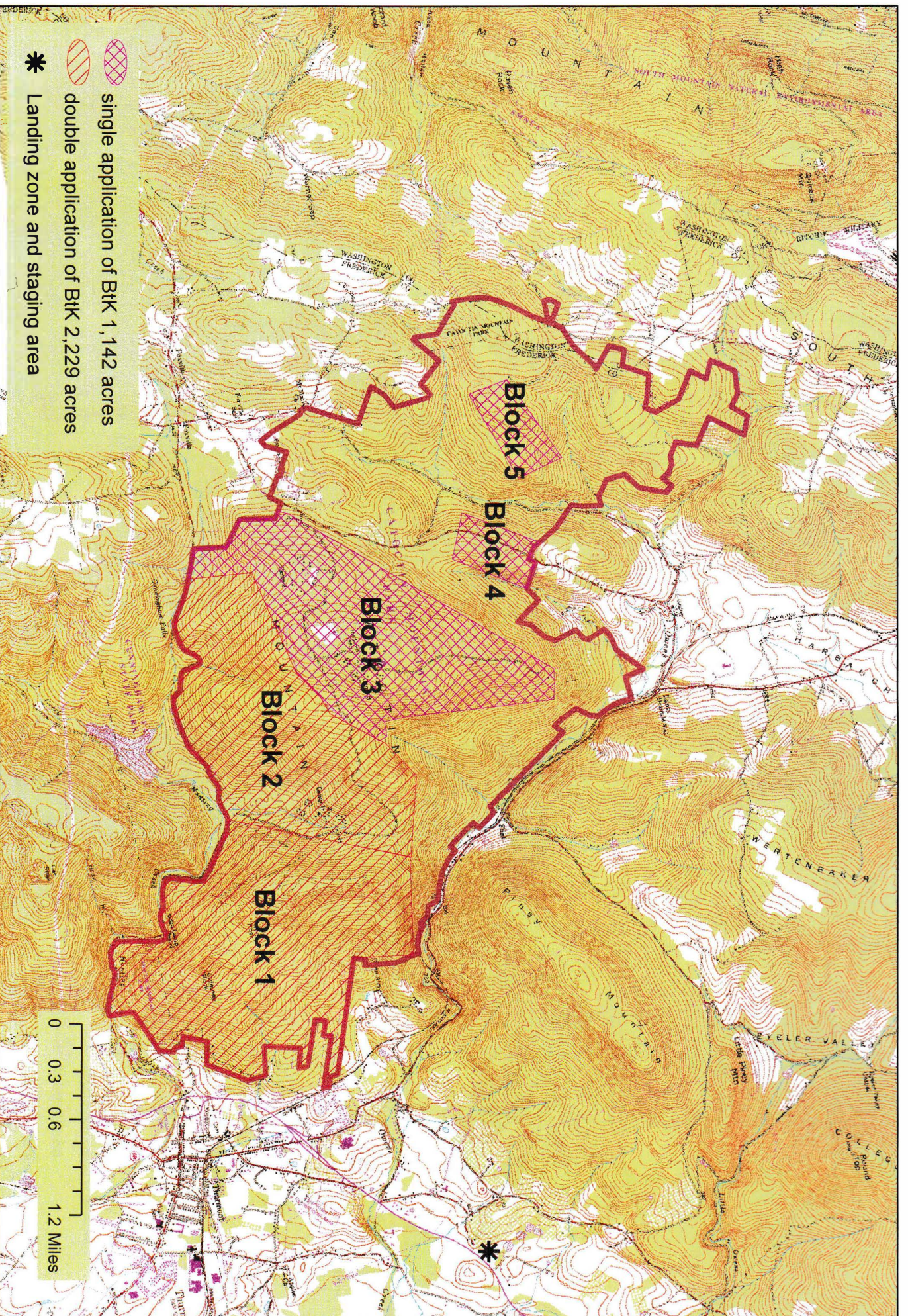
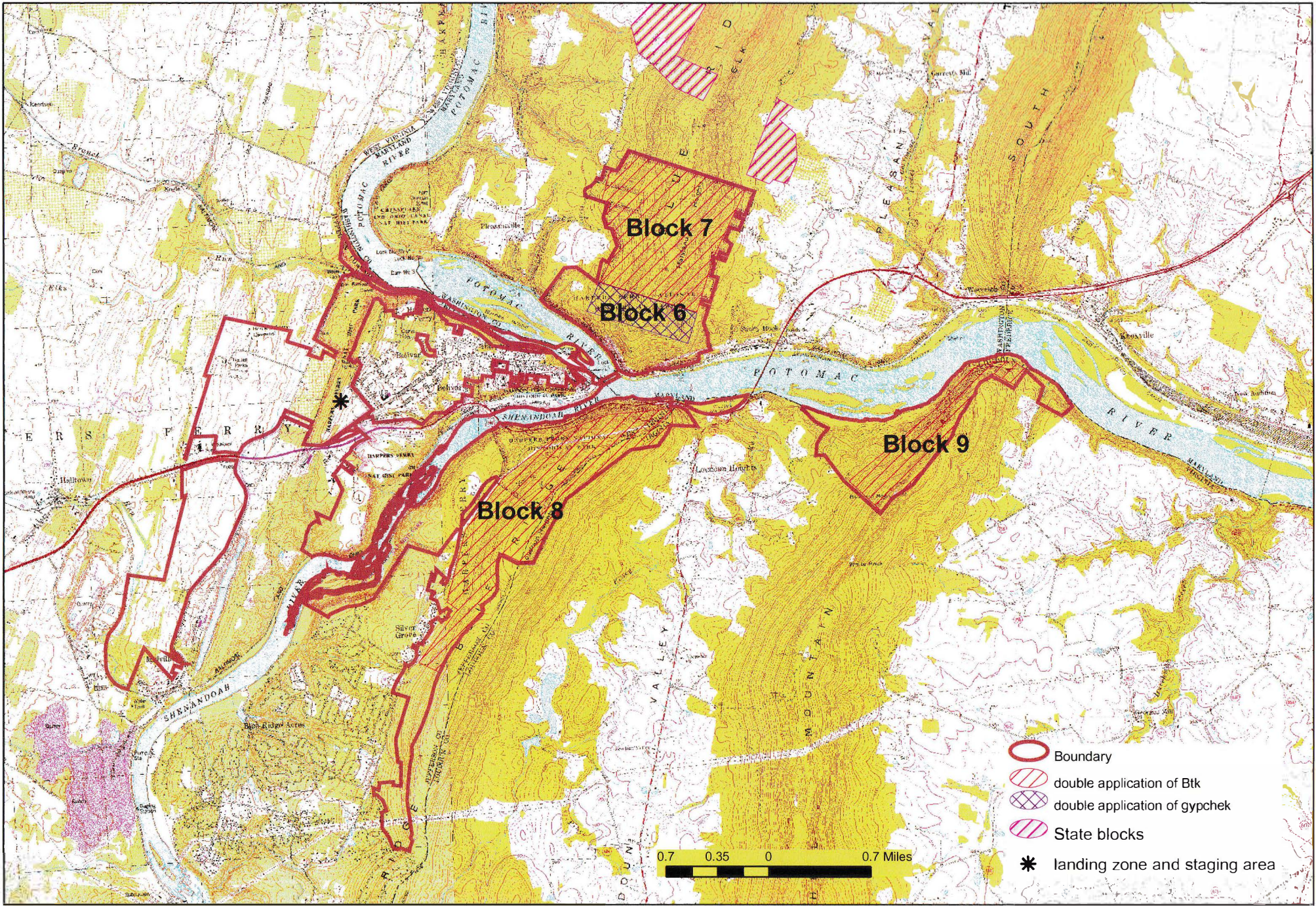


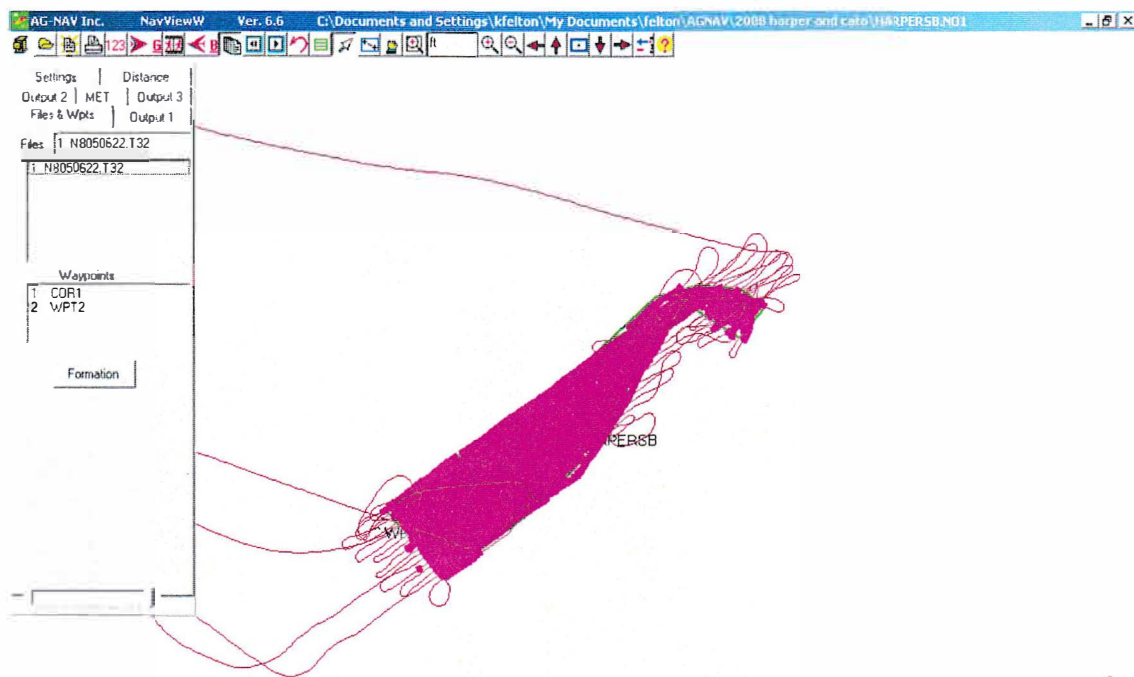
Figure 2. -- 2008 Harpers Ferry National Historic Park spray block map.



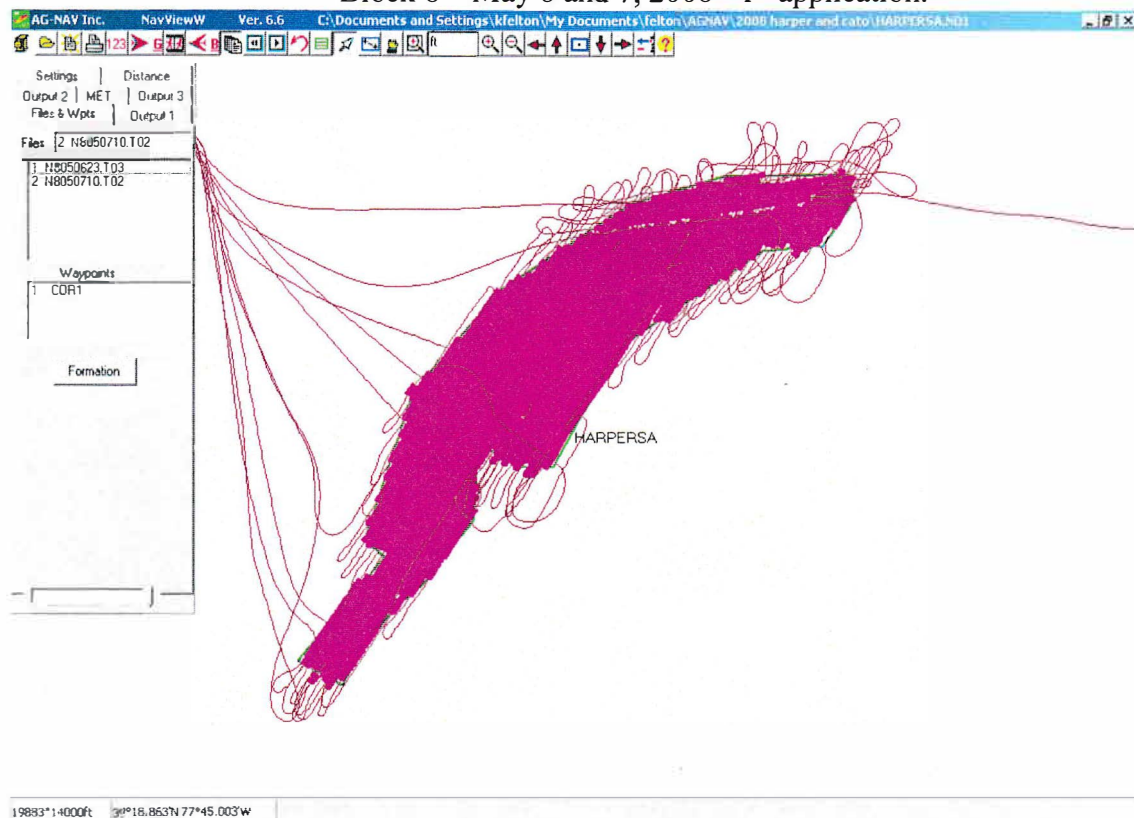
APPENDIX B

AG-NAV PRINTOUTS

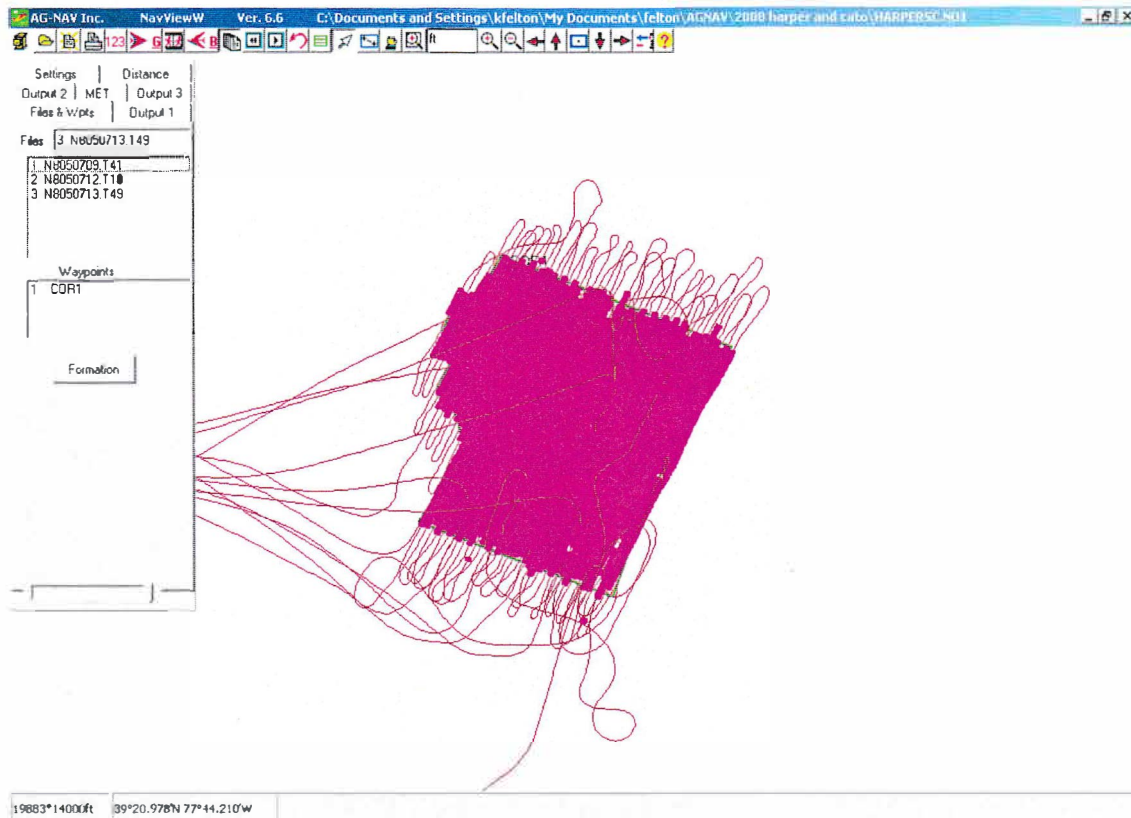
Harpers Ferry National Historical Park Gypsy Moth Suppression Project
Block 9 – May 6, 2008 - 1st application.



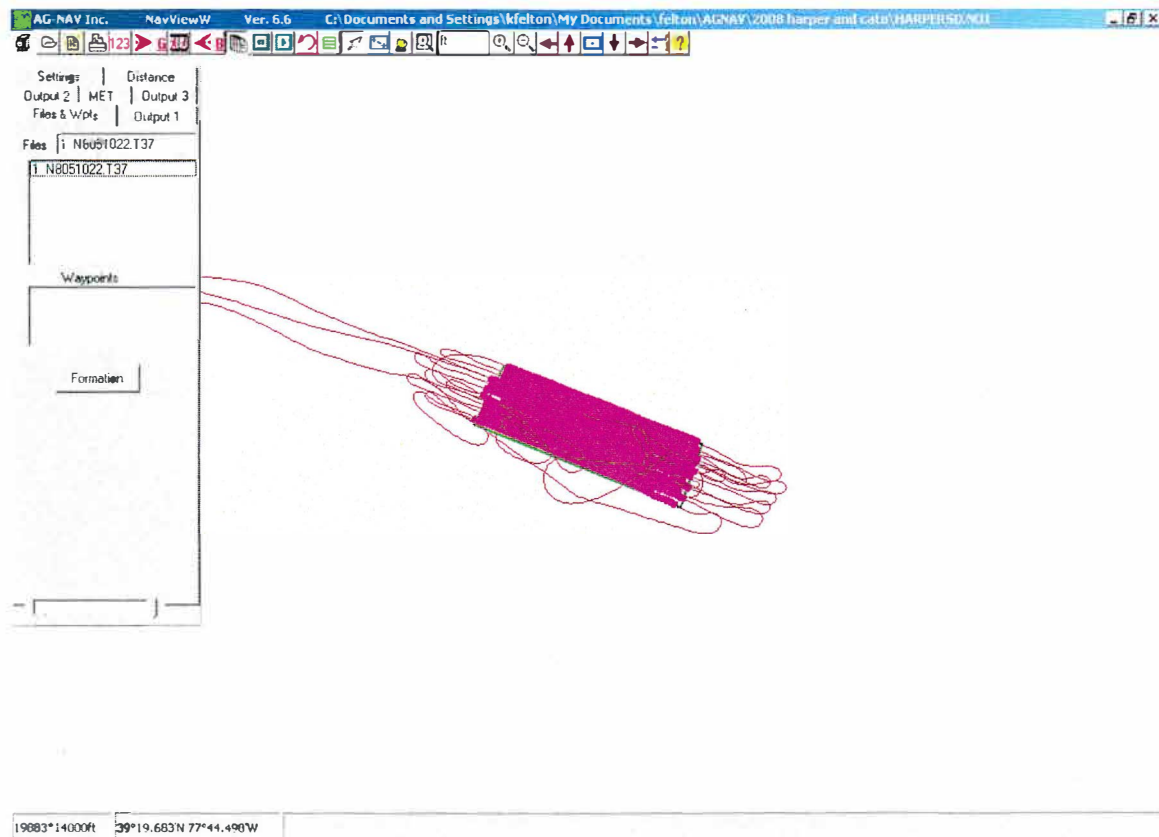
Harpers Ferry National Historical Park Gypsy Moth Suppression Project
Block 8 – May 6 and 7, 2008 - 1st application.



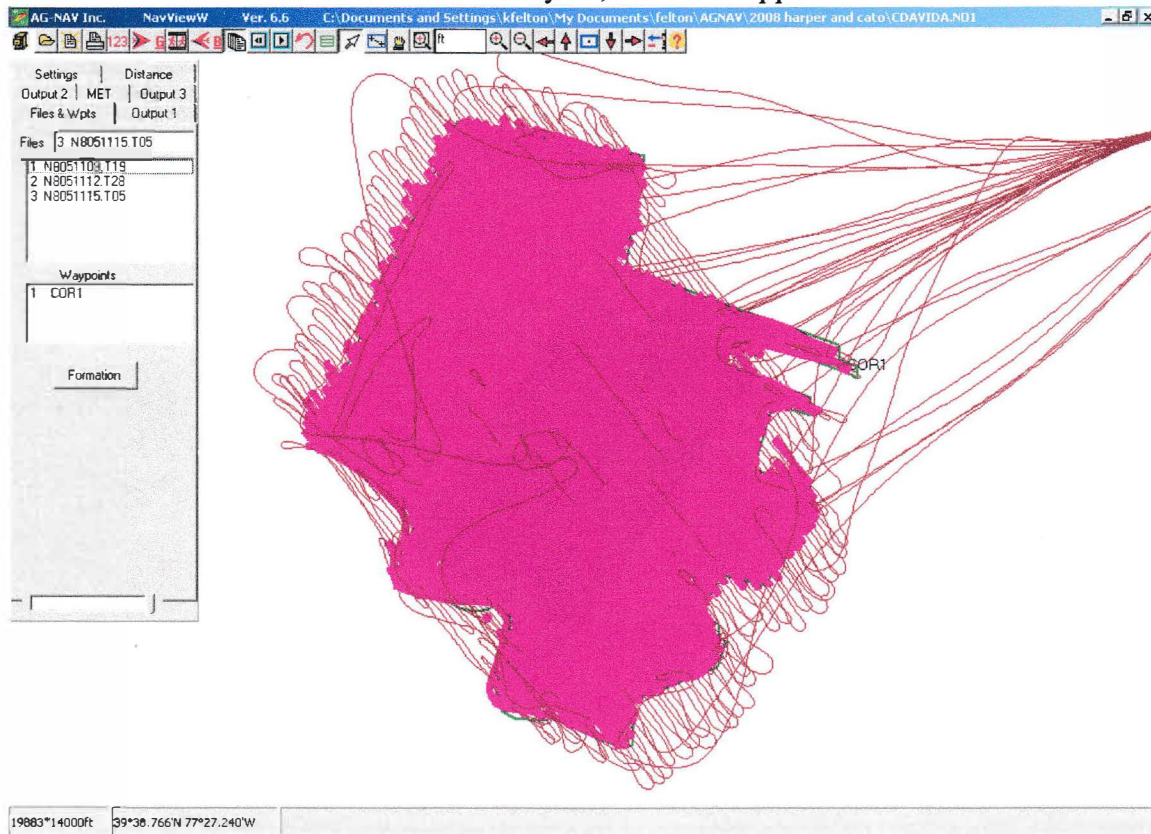
Harpers Ferry National Historical Park Gypsy Moth Suppression Project
Block 7 – May 7, 2008 - 1st application.



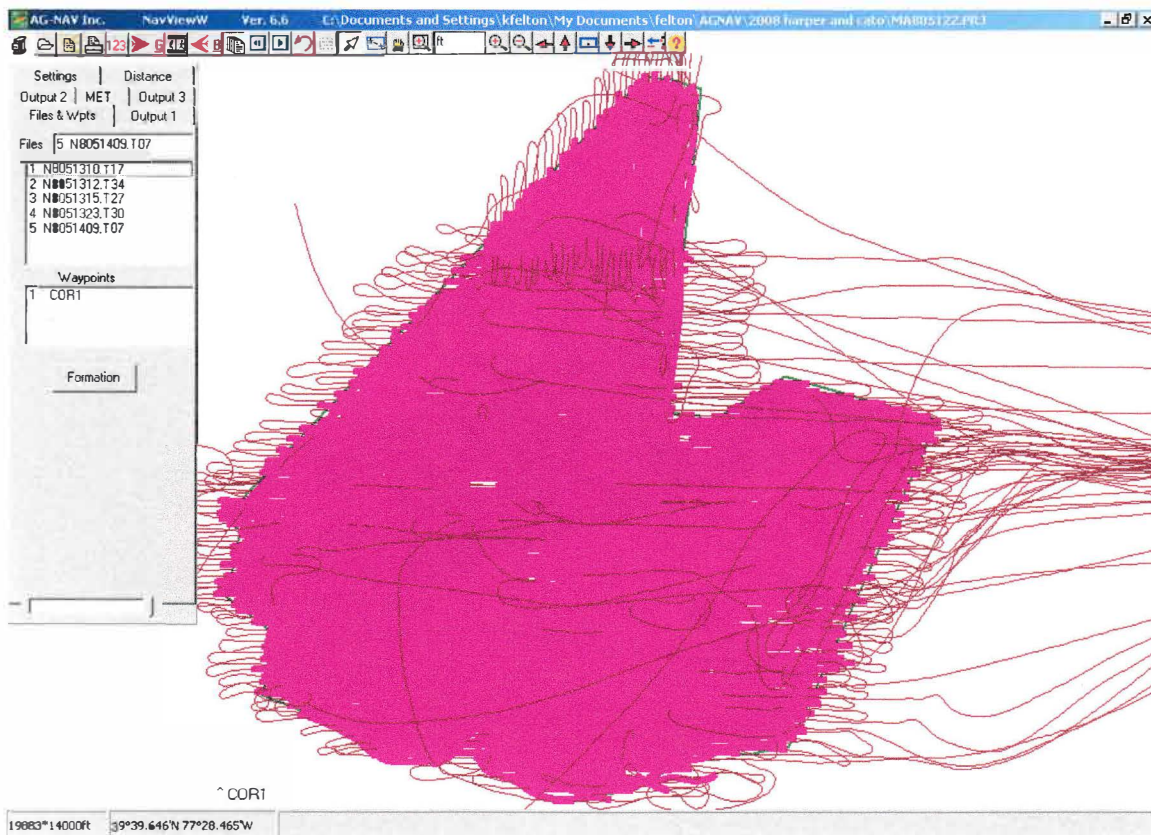
Harpers Ferry National Historical Park Gypsy Moth Suppression Project
Block 6 – May 10, 2008 - 1st application.



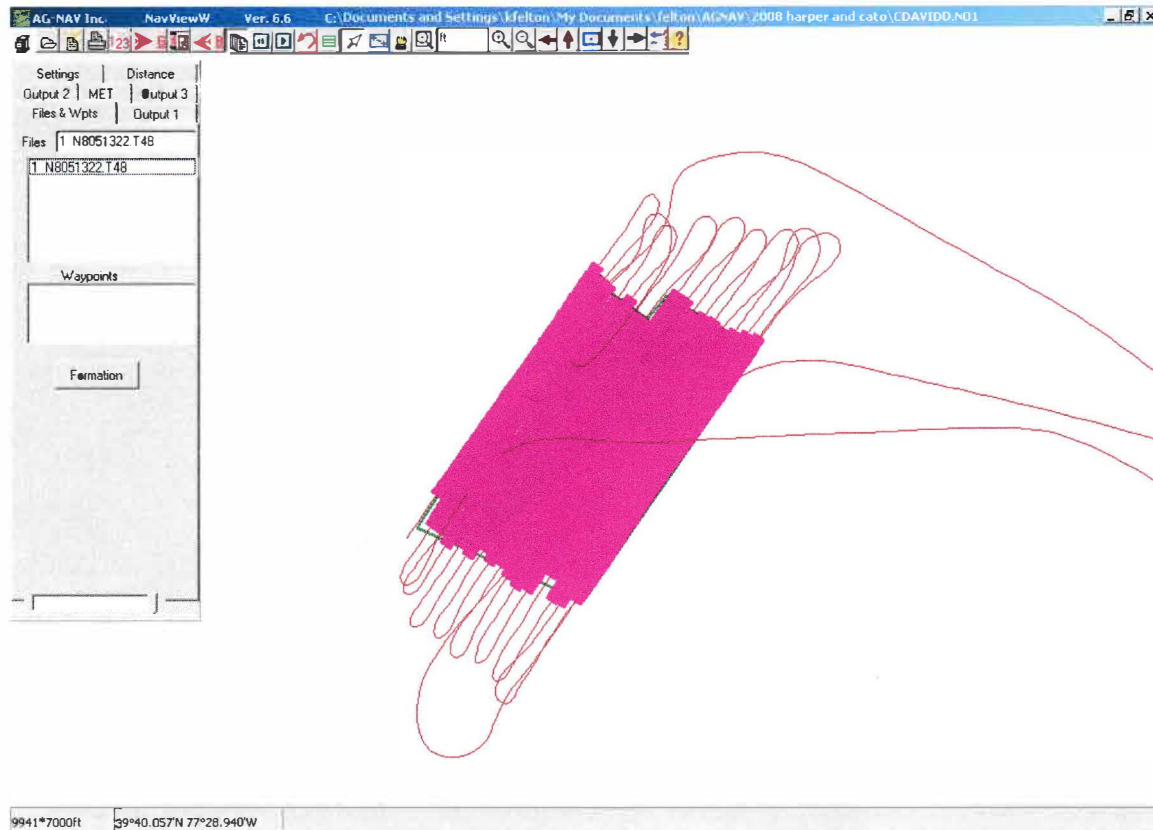
Catoctin Mountain Park Gypsy Moth Suppression Project Block 1 – May 11, 2008 - 1st application.



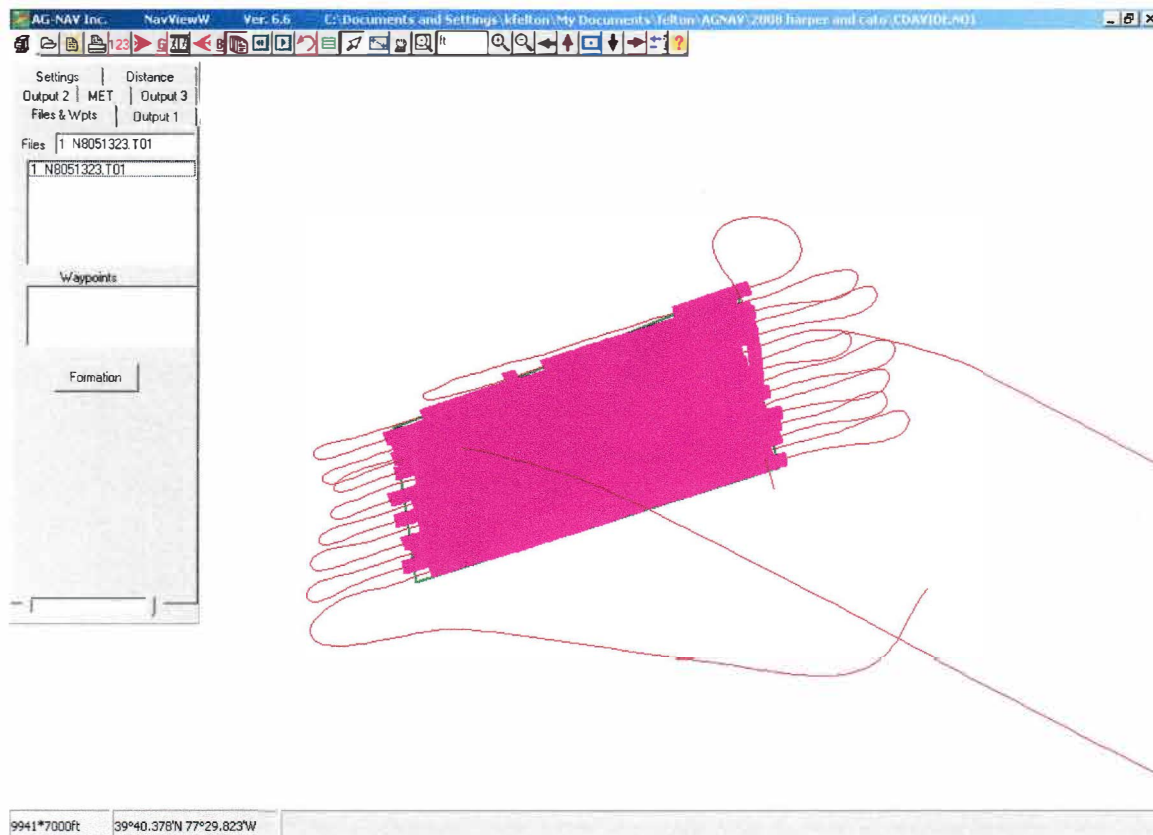
Catoctin Mountain Park Gypsy Moth Suppression Project Block 2 and 3 – May 13 and 14, 2008 - 1st application (there is only one application in block 3).



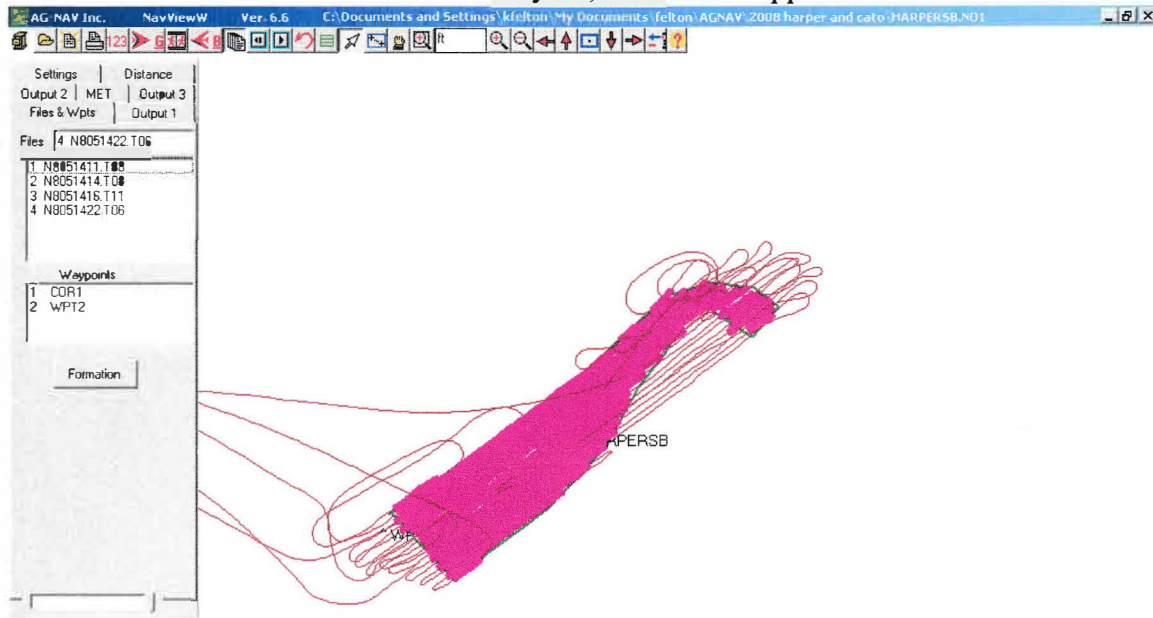
Catoctin Mountain Park Gypsy Moth Suppression Project
Block 4 – May 13, 2008.



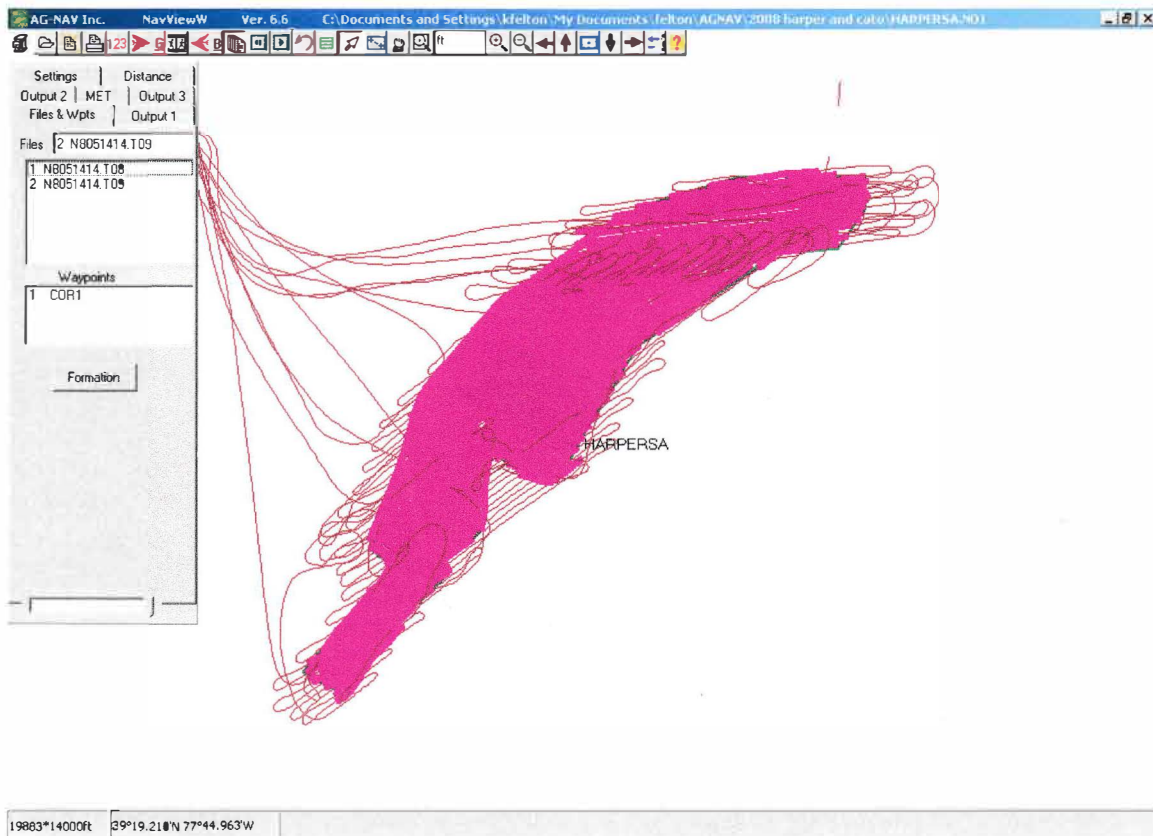
Catoctin Mountain Park Gypsy Moth Suppression Project
Block 5 – May 13, 2008.



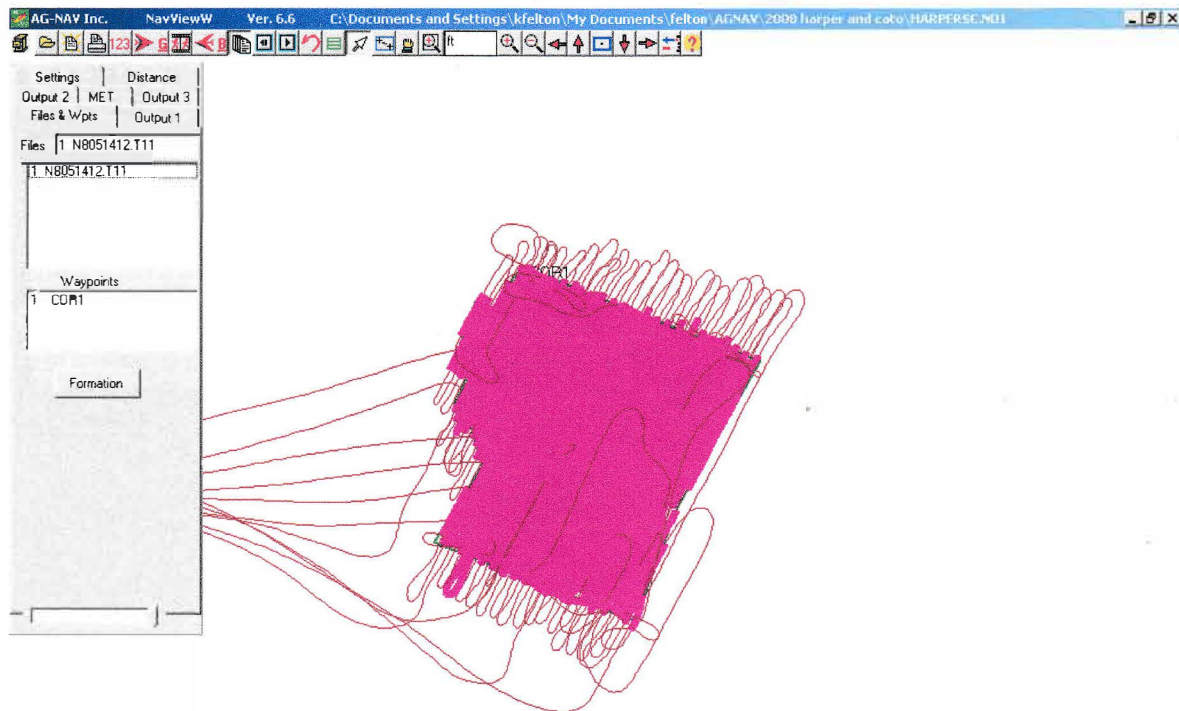
Harpers Ferry National Historical Park Gypsy Moth Suppression Project
Block 9 – May 14, 2008 – 2nd application.



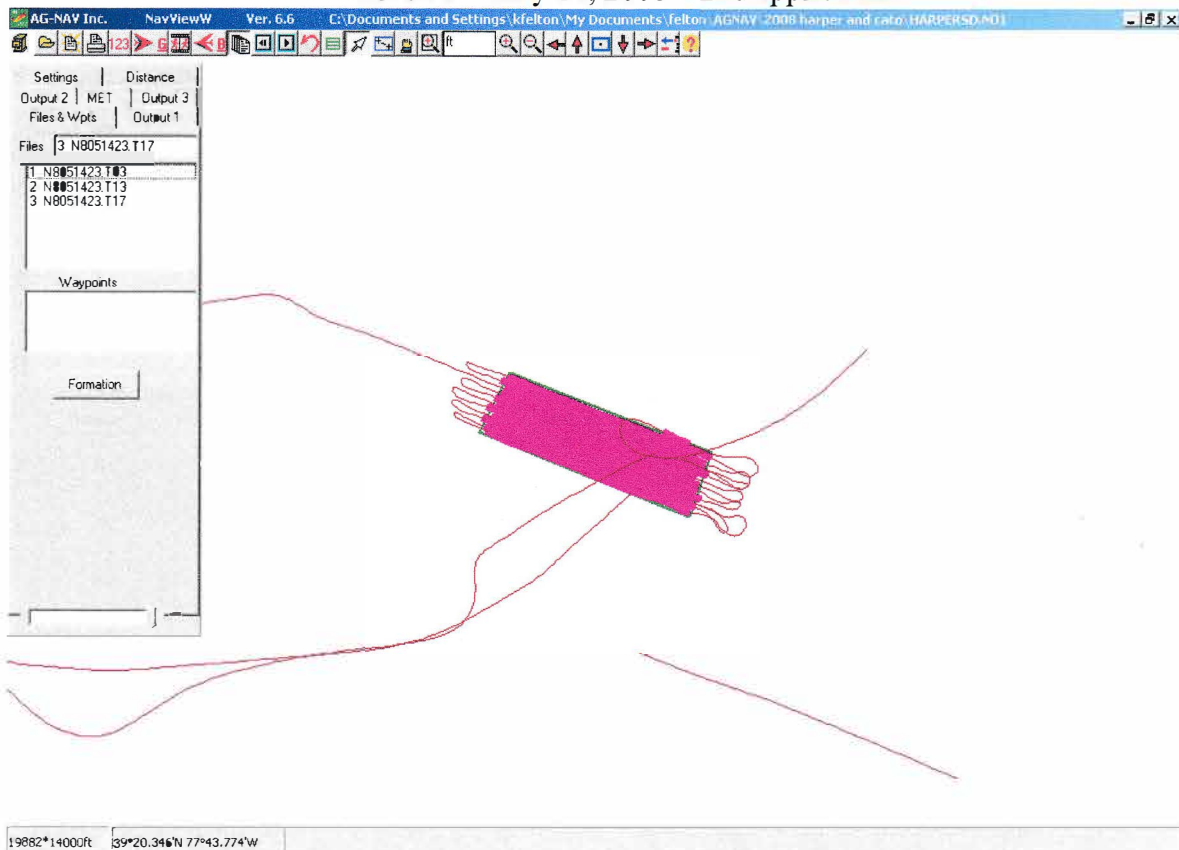
Harpers Ferry National Historical Park Gypsy Moth Suppression Project
Block 8 – May 14, 2008 – 2nd application.



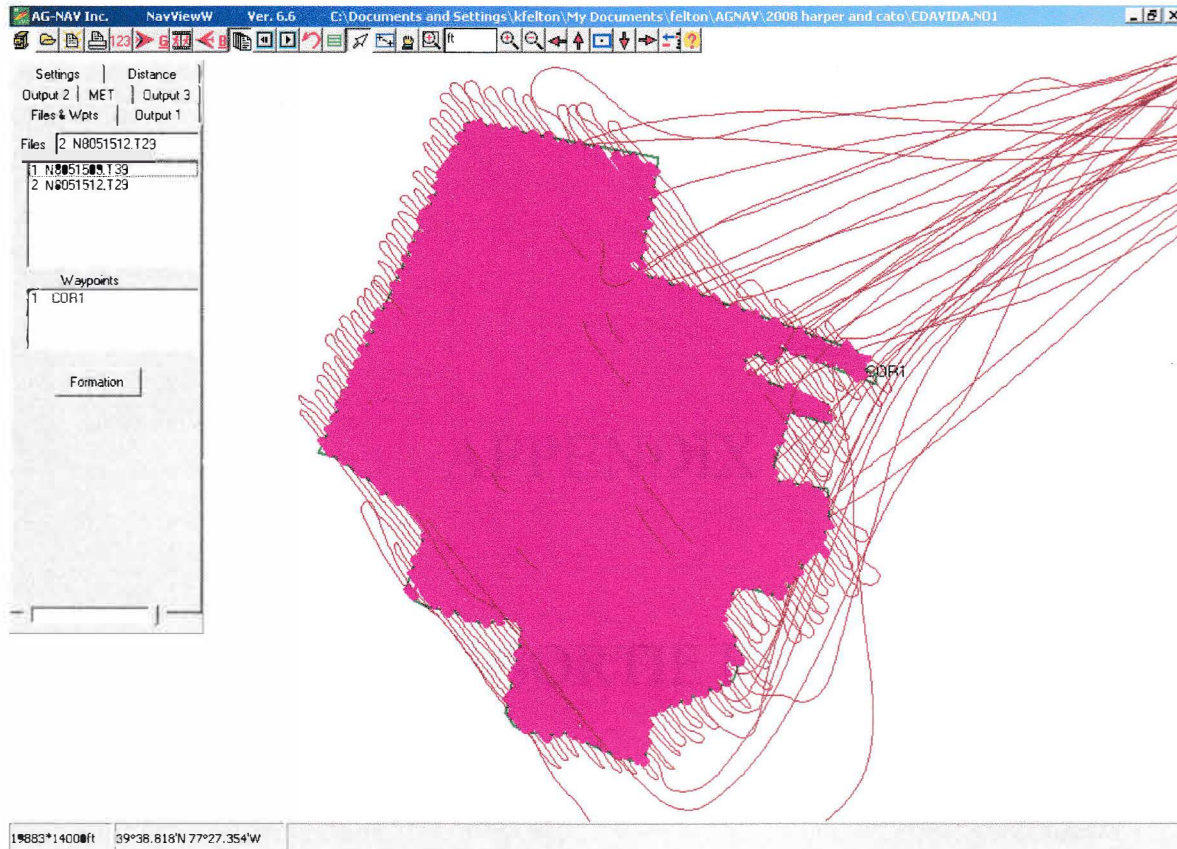
Harpers Ferry National Historical Park Gypsy Moth Suppression Project
Block 7 – May 14, 2008 – 2nd application.



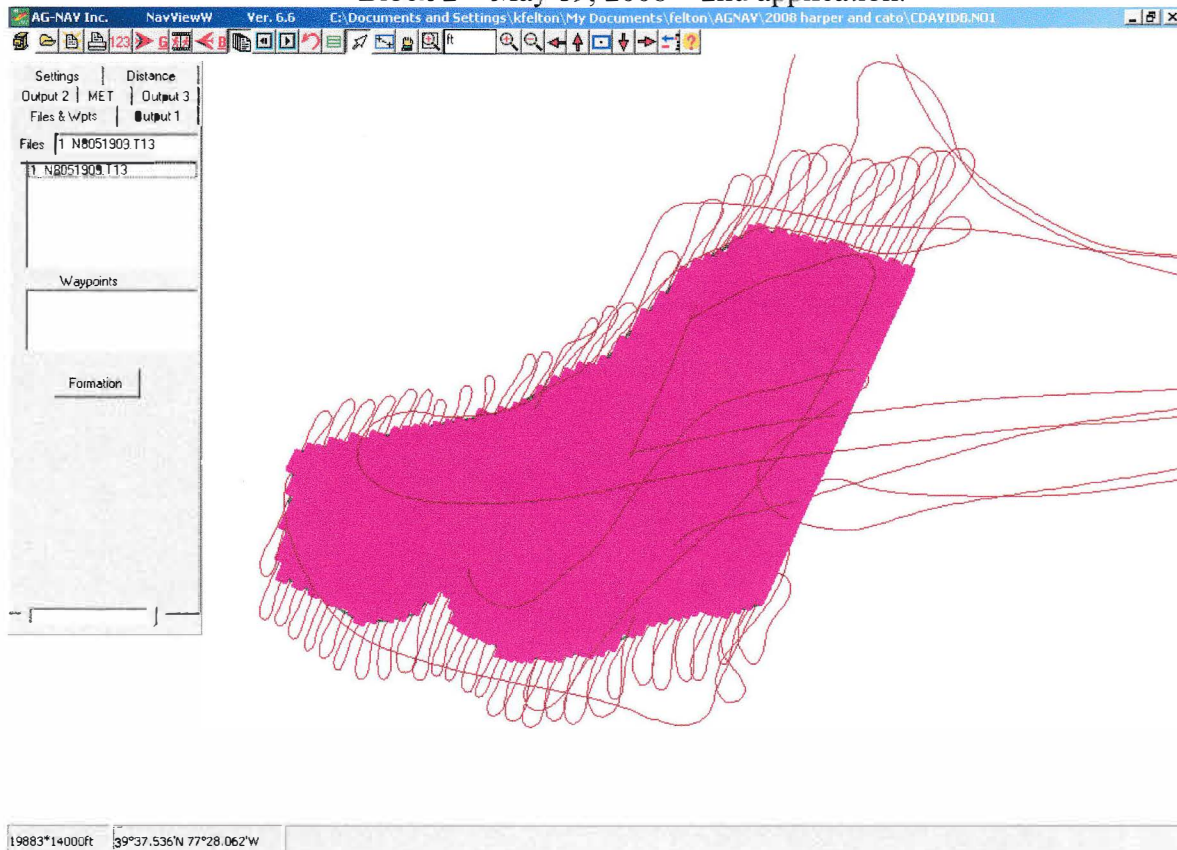
Harpers Ferry National Historical Park Gypsy Moth Suppression Project
Block 6 – May 14, 2008 – 2nd application.



Catoctin Mountain Park Gypsy Moth Suppression Project
Block 1 – May 15, 2008 – 2nd application.



Catoctin Mountain Park Gypsy Moth Suppression Project
Block 2 – May 19, 2008 – 2nd application.



APPENDIX C

DAILY SORTIE REPORTS

DAILY SORTIE REPORT

Project coordinator: Rod Whitman

Date: 5/10/08

Location: Harpers Ferry

Aircraft ID: 206BF

Pilot: Jim Carlton

[illegible]

COMMENTS (Cause of delays, accidents, reason for shut-downs etc.)

Block # 6 = Gyphok block 100 acres treated

First application at HAFE now complete

SIGNATURES

Project Coordinator:

Contractors Representative:

DAILY SORTIE REPORT

Project coordinator: Rod Whiteman

Date: 5/11/08

Aircraft ID: 206 BE

Location: CMP

Pilot: Jim Carlton

Load #	Gallons	Take off time	Return time	Acres treated	Block ID
1	60	0551	0613	80	1
2	60	0617	0637	80	1
3	60	0640	0655	80	1
4	60	0658	0713	80	1
5	60	0715	0729	80	1
6	60	0732	0746	80	1
7	60	0748	0802	80	1
8	60	0804	0817	80	1
9	60	0819	0833	80	1
10	60	0835	0849	80	1
11	60	0852	0905	80	1
12	60	0907	0919	80	1
13	60	0923	0937	80	1
14	60	0940	0955	80	1
15	60	0958	1001	80	1
16	47.25	1021	1041	63	1

COMMENTS (Cause of delays, accidents, reason for shut-downs etc.)

total acres for day is 1263

all btlc

Block #1 is complete

SIGNATURES

Project Coordinator:

Rod Whiteman

Contractors Representative:

John W. Reed

DAILY SORTIE REPORT

Project coordinator: Rod Whiteman

Date: 5/13/08

Aircraft ID: 206BE

Location: Cmp

Pilot: Jim Carlton

Load #	Gallons	Take off time	Return time	Acres treated	Block ID
1	60	0559	0620	80	2,3
2	60	0622	0638	80	2,3
3	60	0639	0656	80	2,3
4	60	0658	0714	80	2,3
5	60	0716	0732	80	2,3
6	60	0734	0749	80	2,3
7	60	0751	0806	80	2,3
8	60	0808	0823	80	2,3
9	60	0823	0840	80	2,3
10	60	0842	0900	80	2,3
11	60	0902	0916	80	2,3
12	60	0918	0935	80	2,3
13	60	0937	0953	80	2,3
14	60	0955	1013	80	2,3
15	60	1015	1033	80	2,3
16	60	1034	1049	80	2,3
17	60	1051	1106	80	2,3
18	60	1107	1125	80	2,3
19	60	1855	1919	80	4
20	60	1921	1942	80	4,5
21	60	1944	2004	80	2,3,5
22	60	2005	2026	80	3

COMMENTS (Cause of delays, accidents, reason for shut-downs etc.)

Treated 1760 acres at BT

Finished blocks 2, 4 and 5

351 acres left in block #3 to finish block

SIGNATURES

Project Coordinator:

Rod Whiteman

Contractors Representative:

John W. Ruel

DAILY SORTIE REPORT

Project coordinator: Rod Whiteman

Date: 5/14/88

Aircraft ID: 2008E

Location: CMP + Harpers Ferry

Pilot: Jim Canlon (Loads 1-18)

John Reed (Loads 19-22)

Load #	Gallons	Take off time	Return time	Acres treated	Block ID
1	52	0540	0603	69.33	3
2	52	0604	0629	69.33	3
3	52	0630	0649	69.34	3
4	52	0651	0715	69.3	3
5	55.3	0715	0750	73.7	3
6	60	0813	0834	80	7
7	60	0836	0853	80	7
8	60	0855	0912	80	7
9	60	0913	0930	80	7
10	60	0932	0949	80	7
11	60	0951	1015	80	7,8
12	60	1017	1033	80	8
13	60	1036	1050	80	8
14	60	1051	1109	80	8
15	60	1112	1130	80	8
16	60	1132	1150	80	8
17	59.3	1151	1209	79	8
18	60	1211	1233	80	9
19	45	1835	1852	60	9
20	44.3	1855	1911	59	9
21	45	1917	1932	60	6
22	30	1935	1945	40	6

COMMENTS (Cause of delays, accidents, reason for shut-downs etc.)

Load #5 → landed at Harpers Ferry

Treated 351 acres at CMP - all BT

Treated 1039 acres at HAFE in the am - all BT

Treated 211 acres at HAFE in the pm - 111 ac BT

100 ac Gypsy check

SIGNATURES

Project Coordinator:

Rodney H. Whiteman

Contractors Representative:

John W. Reed

DAILY SORTIE REPORT

Project coordinator: Rod Whiteman

Date: 5/15/08

Aircraft ID: 2008E

Location: CMP

Pilot: John Reed

Load #	Gallons	Take off time	Return time	Acres treated	Block ID
1	60	0543	0608	80	1
2	60	0610	0625	80	1
3	60	0637	0650	80	1
4	60	0652	0709	80	1
5	60	0711	0725	80	1
6	60	0726	0739	80	1
7	60	0741	0755	80	1
8	60	0756	0808	80	1
9	60	0809	0822	80	1
10	60	0823	0837	80	1
11	60	0838	0850	80	1
12	60	0851	0903	80	1
13	60	0905	0917	80	1
14	60	0918	0929	80	1
15	60	0931	0945	80	1
16	47.25	0947	1007	63	1

COMMENTS (Cause of delays, accidents, reason for shut-downs etc.)

Treated 1263 acres, all BT

all of Block #1, 2nd app in block #1

SIGNATURES

Project Coordinator:

Rod Whiteman

Contractors Representative:

John Reed



United States
Department of
Agriculture

Forest
Service

Northeastern Area
State and Private Forestry

180 Canfield Street
Morgantown, WV 26505-3101

File Code: 3400

Date: May 22, 2008

Ms. Jill Swearingen
USDI National Park Service
Center for Urban Ecology
4598 Mac Arthur Boulevard, NW
Washington, DC 2007

Dear Jil:

Enclosed is the report that documents the gypsy moth suppression project at Harpers Ferry National Historical Park and Catoctin Mountain Park from May 6-19, 2008

A total of 2500 acres were treated at Harpers Ferry National Historical Park and 5603 acres at Catoctin Mountain Park. The microbial insecticides Gypchek and Bacillus thuringiensis variety kurstaki were used and were applied using rotary-winged aircraft.

I would like to thank all involved with the project especially Bill Hebb, Dale Nesbitt, Sean Denniston, and Becky Loncosky for all their time and efforts. Their help was invaluable.

Treatment efficacy will be evaluated through defoliation surveys conducted in June and egg mass surveys conducted this fall.

Please call me at (304) 285-1555 if you have any questions concerning the suppression project or report.

Sincerely,

RODNEY L. WHITEMAN
Forester
Forest Health Protection
Morgantown Field Office

Cc: Mel Poole, CATO
Sean Denniston, CATO
Donald Campbell, HAFE
Bill Hebb, HAFE
Robert Lueckel, MFO
Noel Schneeberger, AO

Enclosure

RLW/blm

